CLC2006 Support Package

InterChange 2.0

for interpreters of land cover changes

User Manual

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1. InterChange program

1.1. CLC2006 Support Package

Background

CLC2006 Support Package is a significantly modified and improved version of CLC2000 Support Package. The CLC2000 software has been developed for Remote Sensing Centre of Hungarian Institute of Geodesy, Cartography and Remote Sensing (FÖMI), in order to help the implementation of the European CLC2000 project managed jointly by the European Environment Agency (EEA) and Joint Research Centre (JRC). The CLC2000 software was also used by many European national teams, 15 out of 30 participating countries used it for interpreting changes in CLC2000 project. CLC2006 Support Package is distributed by **MLOG Instruments Ltd.**, Budapest, Hungary (www.mlog.hu/CLC2006/, fax: 36–1 416 56 50).

Main features

CLC2006 Support Package operates under **ArcView** environment. ArcView software is designed primarily for viewing GIS databases with tools for creating maps, menus for handling databases and graphical editing tools. At the same time, ArcView includes only limited and less effective tools for creating and filling new polygon databases or modifying existing polygon databases. As a solution, CLC2006 Support Package under ArcView provides a cheap tool for quick and comfortable editing and handling of CORINE Land Cover databases. CLC2006 Support Package is a macro package written in *Avenue*, ArcView's own macro language. The software is a supplement to ArcView 3.2/3.3 GIS. Working with CLC2006 Support Package requires a basic knowledge of using ArcView GIS. The use of the CLC2006 Support Package significantly facilitates updating, change detection, quality control and correction of land cover databases by means of computer-assisted visual photointerpretation.

Minimum system requirements

- IBM PC compatible computer,
- 2 GHz processor,
- 512 MB RAM,
- 17" monitor, at least 1024x768 pixel resolution,
- Windows 95/98 or Windows NT/2000/XP operation system,
- ArcView GIS 3.2/3.3 software.

CLC2006 Support Package consists of four interrelated programs, all which can be used independently.

InterPrepare for the national central team

InterPrepare can be used for the preparation of source files and work directories for change detection to be carried out with InterChange. For interpreting changes with InterChange program, a pre-described directory structure has to be built for the interpreters. The directory structure should contain all files needed for change detection. The source data must have a pre-set record structure. All the above tasks can be simply solved with InterPrepare. CLC code table editor allows substitution of standard English CLC nomenclature category names and descriptions with national language nomenclature in InterChange program. Nomenclature can be edited and can also be extended with fourth and fifth level categories if required.

InterChange for interpreters of land cover changes

InterChange program provides a tool for the revision of CLC2000 land cover database and supports the interpretation of land cover changes in order to create the CLC2006 database. The program provides a convenient and easy-to-use interface for editing polygons in CLC2000 and CLC-Change databases, for viewing and modification of polygons' data and for finding and correction of errors generated during interpretation and editing. InterChange program was designed specially for revision of existing land cover databases and interpretation of land cover changes. It is unsuitable for primary interpretation of satellite images and for building up an independent land cover database. For

these purposes a separate program called InterView was developed, which has been used in the production of national CLC2000 databases in Croatia, Hungary and Serbia-Montenegro.

InterCheck for checking final databases

InterCheck program serves the checking of revised CLC2000 and CLC-Change map sheets (working units). InterCheck program has been prepared primarily for supporting the *CLC2006 Technical Team*, although national central teams might apply it as a tool for final checking of the completed CLC2006 and CLC-Change databases. InterCheck can be used for checking CLC2006 and CLC-Change databases in any file format that can be added to ArcView program as a theme (ArcView shapefile, ARC/INFO coverage, AutoCAD drawing etc.), i.e. not only those that has been prepared with InterChange.

1.2. Services

Red color indicates new services in InterChange 2.0 versus 1.0.

Creating new change-database

- When InterChange is started for the first time, it automatically creates a workspace optimised for change detection and an empty change database, on which the interpretation can immediately be started.

Polygon editing functions

The interpreter can easily

- correct errors in the CLC2000 database and create new polygons in the change-database;
- create a new polygon inside a polygon;
- split a polygon into two parts;
- unify two neighbouring polygons;
- delete polygons.

Tools supporting interpretation

- InterChange program displays CLC2000 database and the change database in two separate View windows (**2000**, **2006**) constantly synchronising their content.
- All data belonging to a selected polygon are shown in the CLC data window.
- The program keeps checking for interpretation rules and warns the interpreter when errors occur during data editing and data input.
- Edited data are integrated into the corresponding database with a single click.
- Interpreter can change from screen divided between two windows to full screen view of one window with a single click.
- The environment of the selected polygon(s) can be masked out.
- Data can be edited quickly (usually also by using the keyboard).
- CLC code can be selected from a list box.
- A short comment can be added to polygons.
- Interpreter can modify also CLC2000 code of change polygons.
- Interpreter can add *technical change* attribute to change polygons.
- Colour of polygon outlines as well as colour and size of code labels can be set separately for the two windows.
- Centre of the workspace can be positioned to a user specified XY coordinate.
- Actual coordinates and scale of the active View window can be saved to hard disc and can be reloaded with a click.
- Interpreter can search for polygons according to several characteristics, such as CLC code, change type, comment, error, supervisor's remark, progress status, area, change probability or technical change.
- New principle and advanced features are available for importing, searching and fulfilling supervisor's remarks.

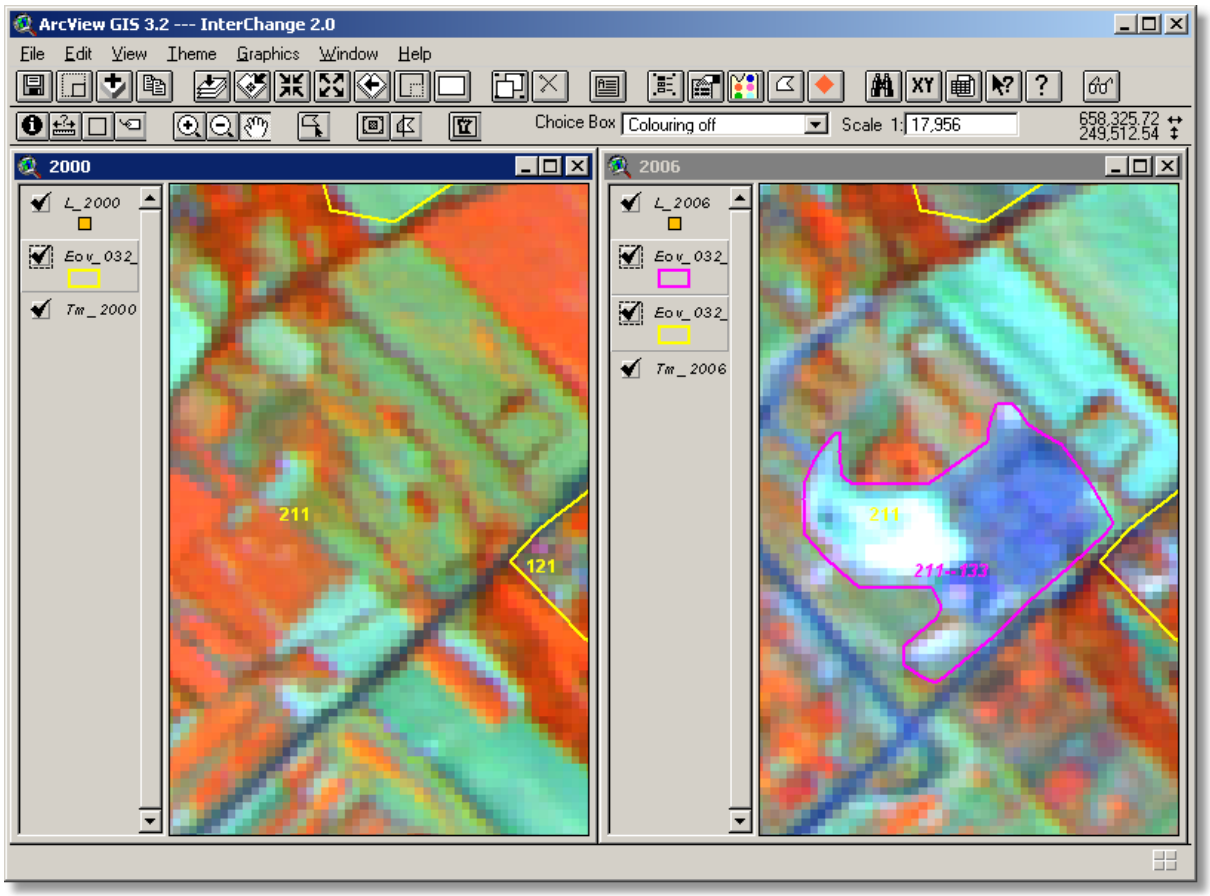
Main error prevention functions

- When selecting and writing in the CLC code, the program does not allow the use of invalid category codes.

- When editing polygons, the program warns if the created polygon is smaller than the size limit or is a multipart polygon.
- Non-adjacent polygons cannot be unified.
- An error checking and correcting tool helps to find and correct overlapping or multipart polygons, selecting polygons below size limit, with shape error, with invalid or zero code.

Information support

- LUCAS land cover and land use data and field photos can be viewed with a single click (if data available on computer).
- With optional error colouring, the interpreter gets an overview of areas yet to be interpreted, small polygons, polygons with shape error or without code.
- Code colouring shows interpreted areas with standard international CORINE colour coding.
- Work status colouring allows the interpreter to follow the progress made in change detection, the size and position of areas yet to be examined.
- Code change colouring helps identification of those changes that are less likely to occur, thus might need further consideration.
- Code labels of polygons can be switched off/on and can be refreshed.
- A temporary code label can be placed anywhere in the polygon.
- Detailed description of a chosen code can be obtained in a separate window with a single click. Description might also be available in national language instead of English (the content being the responsibility of the national project leader).
- With the area measurement tool the area of a planned polygon can be quickly estimated.
- Advanced code, polygon area and code change probability statistics available.
- Thicker polygon outlines as well as larger code labels can be switched on before creating screenshots for documents and reports.
- InterChange program provides all menus, pop-up texts, information lines and dialog boxes in English.
- Detailed help, context sensitive help and printable user's guide (all in English) are inherent parts of the program.



2. First steps

2.1. Project file characteristics

ArcView program handles land cover databases grouped in so called *projects*. A single project might contain several independent files such as: raster databases (satellite images, scanned maps), vector databases (land cover maps, vectorized maps), tables, graphs, layouts, scripts. The project file links these project elements. Project file has **`.apr`** extension. Individual elements remain independent files regardless of their belonging to the project. Project contains only links according to path and file name, not the files themselves. However, the project file's text contains in full the links created between files within ArcView, current settings of ArcView's windows, menus and controls, newly created dialog boxes and supplementary macros. Thus the individual settings and tools developed within a project – such as the ones in **CLC2006 Support** macro packages – are available only when the given project (or projects created by modifying it) is opened.

Since a project file stores links to files with full path, the project file containing the links should not be simply moved to another location or computer, not even if all linked files are moved or copied to that location. If you move a project file this way, the re-located project will search for the linked files at their original path. If the project is saved to another location and with a different name with **File** – **Save Project As** command, it will use (and mutually overwrite) the linked files together with the original project. For this reason the empty project (containing one of the **CLC2006 Support** program) automatically sets its parameters depending on directory structure upon it's first starting. The empty CORINE database files are created in the project directory also upon the first start. Therefore **CLC2006 Support Package** project files should not be moved after their first opening, as this renders them useless.

2.2. Installation

- Create a new directory for CLC2006 work at any location on your computer. The directory name is optional, but is must not exceed 8 characters. Suggested names are e.g.: **`clc`**, **`clc2006`** or **`corine`**. Be careful that you use short directory and file names (8+3 usable characters: **`A-Z`**, **`0-9`** and **`$ _ ~ ^ ! # % & { } ( ) ' @`** only) on all directory levels of paths referred to in CLC2006 work (see example).
- Start **`install.exe`** program, which is found in root directory of the source CD (or other data medium) prepared and delivered by the CLC2006 national central team.
- Select source and destination directory. The program automatically specifies the source directory, so normally you do not need to modify it. As destination directory select the directory created on the basis of the first paragraph.
- Click *Install* button. The install program copies the needed directories and files to the specified destination directory and deletes their read-only attribute. (The read-only attribute of files on a CD is always set and it does not change after copying.)

You must not change the name of directories or files. A map sheet (working unit) directory cannot be moved after the first opening of the included project file.

2.3. First opening of a project

Start ArcView program. With **File** – **Open Project** command open the **`interch2.apr`** project file in the map sheet directory you wish to work on. If **`Program`** directory is incomplete, the program gives an error message and the start is unsuccessful. In case of successful opening the InterChange macro package automatically starts. Then from the original source database in the main sheet directory the program creates *CLC2000 database* in the **`Revision`** subdirectory and loads it to **2000 window**. The *CLC2000 database* is given the same name as the map sheet directory except for an '**`r`**' ending (**`r.shp`**, **`r.shx`** and **`r.dbf`** ending). The empty *change database* is created in the **`Change`** subdirectory and is loaded into **2006 window**. Files of the *change database* bear the name of map sheet directory with a '**`c`**' ending (**`c.shp`**, **`c.shx`** and **`c.dbf`** ending). The original source database in the map sheet's base directory remains unchanged during interpretation. After creating and loading

databases, InterChange sets theme legends and some other parameters. Then saves the modified project in a name identical to that of the map sheet directory and sends a message announcing that the project is ready for starting work on.

With **Add theme** button or **View – Add theme** command further themes (layers) can be added to the windows. From the appropriate directory load the satellite images you need for interpretation using this command. You can change the order of layers by dragging and dropping their names in the windows' left side in the legend stripe. Drag satellite images below the *CLC2000* and the *change theme*, respectively before starting interpretation. It is recommended that you switch off (with switch box beside the name) those themes that you do not use at the moment, because redrawing many layers might significantly slow the program's run. This is applicable especially for satellite images and other raster files. Save project again with **File – Save Project** command or **Save project** button before starting interpretation.

Project creates the recommended workspace and window settings upon its first start. It is possible, though impractical to modify it. On later starts the project will always appear with the setting at the last save.

2.4. Customizing the workspace

Before starting to work it is recommended to set monitor resolution to minimum 1024 x 768 pixels and colour depth to 65 536 colours (Hi Color) minimum. If monitor and video card allow, 1280 x 1024 pixels (or higher) and 16 million colours (True Color) is recommended. When setting the monitor resolution do not use large fonts or individual font settings, choose *small fonts* from the font size list. When using larger fonts it might happen that some texts in the program are not fully seen or not perfectly readable.

CLC data window can always be seen in front of the other windows. Dragging the header bar you can move the window. The height of the window – more precisely that of the *CLC code list* within the window – can be adjusted with help of the *Window height* slider in the lower left corner. In case you wish to use the whole screen during an operation it is recommended that you close **CLC data** window. This can be done with *Close* button, ***Alt+C*** keyboard shortcut or the usual Windows close widget in the upper right corner. When one of View windows are active, ***F9*** keyboard shortcut closes and opens **CLC data** window.

Scale of the View windows can be manually set. Optimal scale value depends on the resolution of satellite images and other ancillary data and the actual interpretation task. The usual recommended value is between 1:20 000 and 1:40 000. Larger scale might show unnecessary details and slow down work, while smaller scale might hide some details.

Polygon outline colour, code label colours and font size can be modified in the Settings window. In most of the cases default yellow and magenta are the most suitable (distinctive) colour.

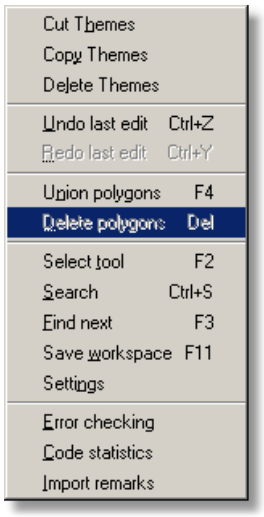
In the course of work files named **`delta1.*`**, **`delta2.*`**, **`...`** might appear in mapsheet directories. These are temporary files created by ArcView during certain operations. These files are normally automatically deleted when exiting ArcView, however, in certain cases deleting fails. During a longer work process these temporary files might pile up. Their presence does not cause errors, though spoil perspicuity of directory content. If disturbed by this, you can delete all **`delta*.*`** files when ArcView is not running. Be careful not to delete any other files!

3. User Interface

3.1. The modified interface

When opening InterChange project window, a modified ArcView interface appears. Only those menus, buttons, tools and popup menus have been modified, that are associated with **2000 window** or **2006 window**. **Edit**, **View** and **Help** menus, button bar, tool bar and popup menu have been changed. **File**, **Theme**, **Graphics** and **Window** menus in the **View** window are left unaltered, these are the same as the original ArcView menus.

3.2. Edit menu



Undo last edit (Ctrl+Z) – state of polygons is rolled back to that at the beginning of the last editing operation. Included in the popup menu, too.

Redo last edit (Ctrl+Y) – after performing **Undo last edit** command, state of polygons is rolled forward by the last undone editing operation. Included in the popup menu, too.

Union polygons (F4) – unifies two selected adjacent polygons. Can be used only when **2000 window** is active. Equivalent to **Union polygons** button.

Delete polygons (Del) – deletes selected polygons. Can be used only when **2006 window** is active. Equivalent to **Delete polygons** button.

Select tool (F2, *n*) – opens **Tool** window, and after pressing the *n* number key (*n* = 0..9) selects the appropriate tool. See keyboard template.

Search (Ctrl+S) – opens **Search** window. You can search for polygons according to several features, such as CLC code, change type, comment, error, supervisor's remark, progress status or technical change. Equivalent to **Search** button.

Find next (F3) – moves to the next polygon that matches search criteria.

Save workspace (F11) – saves momentary co-ordinates and scale of windows. Equivalent to **Save workspace** button.

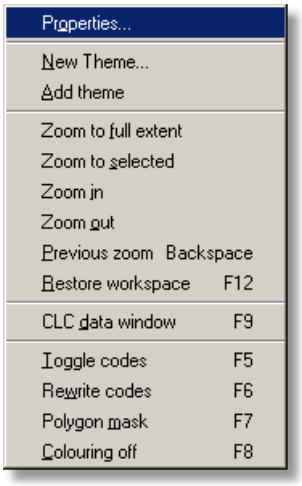
Settings – opens **Settings** window, in which code label and polygon outline colour code label font size and save screen parameters can be set. Equivalent to **Settings** button.

Error checking – starts error checking, which finds and corrects overlapping and multipart polygons and finds polygons under size limit, polygons with shape error and polygons with invalid or missing code. Equivalent to **Error checking** button.

Code statistics – calculates and opens tables containing code statistics of both databases. Equivalent to **Code statistics** button.

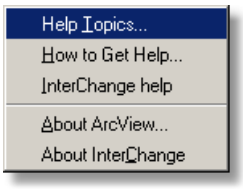
Import remarks – Imports supervisor's remark database created by InterCheck 2.0. Equivalent to **Import remarks** button.

3.3. View menu



Add theme -- adds more themes (layers) to the active window. Equivalent to **Add theme** button.
Zoom to full extent – shows the full extent of all layers. Equivalent to **Zoom to full extent** button.
Zoom to selected – zooms to the size of selected polygons. Equivalent to **Zoom to selected** button.
Zoom in – zooms in on the centre of a view. Equivalent to **Zoom in** button.
Zoom out – zooms out from the centre of a view. Equivalent to **Zoom out** button.
Previous zoom (Backspace) - zooms to previous extent of the windows. Used several times it zooms back to earlier scales. Equivalent to **Previous zoom** button.
Restore workspace (F12) – window co-ordinates and scale are rolled back to the workspace last saved. Equivalent to **Restore workspace** button.
Find XY – opens **XY co-ordinate** window, to find an arbitrary co-ordinate point. Equivalent to **Find XY** button.
CLC data window (F9) – opens and closes **CLC data** window. Equivalent to **CLC data window** button.
Toggle codes (F5) – switches off/on code labels. Equivalent to **Toggle codes** button.
Rewrite codes (F6) – deletes and rewrites all code labels. Equivalent to **Rewrite codes** button.
Polygon mask (F7) – switches on/off the mask covering the selected polygon's surroundings. Equivalent to **Polygon mask** button.
Colouring off (F8) – switches off colouring switched on with **Choice box** list. Equivalent to **Colouring off** button.

3.4. Help menu



InterChange help – opens the help for InterChange program. Equivalent to **InterChange help** button.
About InterChange – shows the banner of InterChange program.

3.5. Button bar

Save project – ArcView's original **Save Project** button. Equivalent to **File – Save Project** menu command.

Save workspace – saves momentary co-ordinates and scale of windows. Equivalent to **Edit – Save workspace** menu command.

Add theme – adds more themes (layers) to the active window, the same as ArcView's original **Add theme** button. Equivalent to **View – Add theme** menu command.

Import remarks – Imports supervisor's remark database created by InterCheck 2.0. Equivalent to **Edit – import remarks** menu command.

Zoom to full extent – shows full extent of all layers. Equivalent to **View – Zoom to full extent** menu command.

Zoom to selected – adjusts scale to the size of selected polygons. Equivalent to **View – Zoom to selected** menu command.

Zoom in – zooms in on the centre of a view. Equivalent to **View – Zoom in** menu command.

Zoom out – zooms out from the centre of a view. Equivalent to **View – Zoom out** menu command.

Previous zoom – zooms to previous scale. Used several times zooms back to earlier scales. Equivalent to **View – Previous zoom** menu command.

Restore workspace – window co-ordinates and scale are rolled back to the workspace last saved. Equivalent to **View – Restore workspace** menu command.

Tile windows on/off – changes from screen divided between the two windows to full screen view and back.

Union polygons – unifies two selected adjacent polygons. Can be used only when **2000 window** is active. Equivalent to **Edit – Union polygons** menu command.

Delete polygons – deletes selected polygons. Can be used only when **2006 window** is active. Equivalent to **Edit – Delete polygons** menu command.

CLC data window – opens and closes **CLC data** window. Equivalent to **View** – **CLC data window** menu command.

Toggle codes – switches off/on code labels. Equivalent to **View – Toggle codes** menu command.

Rewrite codes – deletes and rewrites all code labels. Equivalent to **View – Rewrite codes** menu command.

Settings – opens **Settings** window, in which code label and polygon outline colour code label font size and save screen parameters can be set. Equivalent to **Edit – Settings** menu command.

Polygon mask – switches on/off the mask covering the selected polygon's surroundings. Equivalent to **View – Polygon mask** menu command.

Colouring off – switches off polygon colouring. Equivalent to **View – Colouring off** menu command.

Search – You can search for polygons according to several features, such as CLC code, change type, comment, error, supervisor's remark, progress status or technical change. Equivalent to **Edit – Search** menu command.

Find XY – opens **XY co-ordinate** window, to find an arbitrary co-ordinate point. Equivalent to **View – Find XY** menu command.

Code statistics – calculates and opens tables containing code statistics of both databases. Equivalent to **Edit – Code statistics** menu command.

>>What is this? << help – context-sensitive help. Gives information on the button, tool or menu command selected with the pointer.

InterChange help – opens the help for InterChange program. Equivalent to **Help – InterChange help** menu command.

Error checking – starts error checking, which finds and corrects overlapping and multipart polygons and finds polygons under size limit, polygons with shape error (average width under limit) and polygons with invalid or missing code. Equivalent to **Edit – Error checking** menu command.

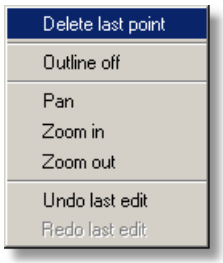
3.6. Toolbar

In order to support fast and effective interpretation, tools in the toolbar can be selected not only with the mouse. You can change tool without moving or releasing mouse by striking two keys with your left hand. Strike ***F2*** keyboard shortcut and the number key corresponding to the tool within the toolbar.

- **Identify (F2, 0)** – gives information on the attributes of a polygon selected by clicking on it in an active theme.
- **Distance (F2, 1)** – gives the distance defined by a line you draw with the mouse and displays it in the status bar.
- **Area (F2, 2)** – gives the area of a polygon drawn with the mouse in hectares.
- **Label (F2, 3)** – labels the polygon with its code at the location you click at inside the polygon.
- **Magnifier (F2, 4)** – Zooms in on the location you click at or on the box you define in the window.
- **Reducer (F2, 5)** – Zooms out from the position you click at or from the box you define in the window.
- **Pan (F2, 6)** – drags and moves the content of the window.
- **Select polygon (F2, 7) –** selects the polygons you click on or you drag a selection box over. In the **2006 window** you can initiate the creation of a change polygon with this tool. With click selects remark point (if any). With ***Ctrl+click*** selects LUCAS data point.
- **Cut out polygon (F2, 8)** – cuts an island or piece from the selected polygon.
- **Split polygon (F2, 9)** – splits the polygon into two separate polygons along a line drawn across the polygon with the pointer.
- **Save screen** – Sets wider polygon outlines as well larger code labels befor creating screen shots for documents and reports.

3.7. Popup menu

Popup menu appears when you right-click in the **2000 window** or **2006 window**. Within the menu you can select a command without releasing right mouse. If you release right mouse button the popup menu disappears.



Delete last point – deletes the last point given while drawing a line or polygon. Repeating the operation deletes the previous points one by one.
Outline off – switches off the bold outline that appears around the selected polygon while performing **Split polygon** or **Cut out polygon** command.
Pan – moves the content of the window so, that the window centre is at the pointer's location.
Zoom in – zooms in on the window so, that the window centre is at the pointer's location.
Zoom out – zooms out from the window so, that the window centre is at the pointer's location.
Undo last edit – state of polygons is rolled back to that at the beginning of the last polygon edit operation. Equivalent to **Edit – Undo last edit** command.
Redo last edit – after performing **Undo last edit** command, state of polygons is rolled forward by the last undone polygon edit operation. Equivalent to **Edit – Redo last edit** command.

4. Interpretation operations

4.1. Editing polygons

4.1.1. Splitting polygon

With the **Split polygon** tool an existing polygon can be cut into two separate parts. First select the polygon to be split by clicking on with this tool. In case you have not selected any polygon (you clicked on area not interpreted) or you selected more than one polygon (clicked too close to polygon borderline) the program sends an error message. A bold outline appears around the selected polygon, which is especially helpful when splitting large or complex-shaped polygons. Bold outline can be switched off any time during drawing with popup menu's **Outline off** command. Instead of – or together with – bold outline you can also use polygon masking. This tool can be switched on with ***F7*** keyboard shortcut or **Polygon mask** button after first click (selection) with split tool, but before you begin to draw.

Position pointer outside the polygon's borderline where you want to start the splitting line. Starting point and endpoint of splitting line must be outside the polygon, otherwise the operation will be unsuccessful. Be especially careful that you split the polygon to no more than two parts and that the parts are connected (not multipart). Define starting point and vertexes with left click and close the line at the endpoint with double-click.

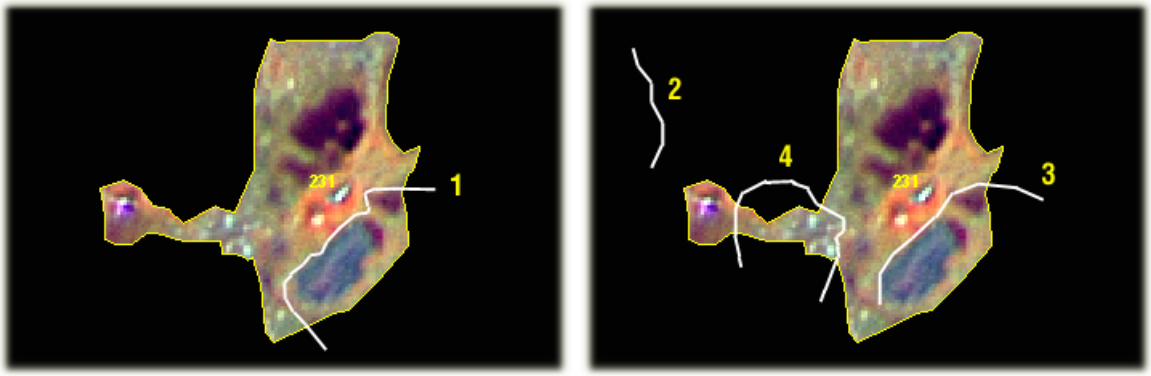
If you wish to zoom in or out while drawing, use popup menu's **Zoom in** or **Zoom out** command. In case the polygon stretches outside the area seen in the window, use popup menu's **Pan** command, which moves the content of the window so, that pointer is located at the centre of the window.

In case you split the polygon into more than two separate parts, the program gives an error message and the operation will be unsuccessful. In the error message dialog box you can decide whether to continue or stop trying. If any of the created polygons is under the size limit, you are also given an error message. This case you can decide whether you wish to execute splitting or not.

If a change area can delineate only on satellite images in **2000 window**, select polygon with ***Ctrl+click***. In this case the bold outline of the selected polygon appears in **2000 window** instead of **2006 window**. Program gives a warning message: *Draw the splitting line in 2000 window!* With help of satellite images for year 2000 you can draw the splitting line in the usual way. The result of the operation appears once again in **2006 window**.

If you used the tool properly the bold polygon outline and/or the mask disappears at the end of operation. If due to improper use they do not disappear, you can switch mask off with ***F7*** keyboard shortcut or **Polygon mask** button. Do not use this button before the splitting operation is finished or you exited the operation without performing the splitting! If you do so, the bold outline left can be erased with Rewrite codes command.

The two polygons created by splitting inherit the original polygon's CLC code, comment, remark and error data. When cutting out a non-island piece from a polygon either Cut out polygon tool and **Split polygon** tool can be used. Choose the tool that allows simpler operation with a smaller possibility of errors.



Left: successful polygon splitting
Right: cases of unsuccessful polygon splitting (bringing up an error message) :
2. the splitting line is outside the selected polygon,
3. the splitting line does not entirely cross the selected polygon
4. the selected polygon would be cut into three parts

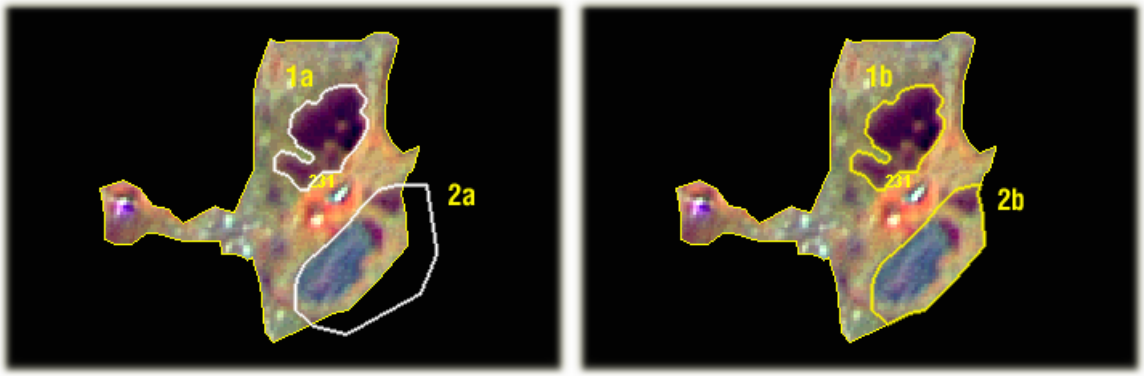
4.1.2. Cutting out polygon

With the **Cut out polygon** tool you can create a new polygon inside an existing polygon. First select the polygon to be cut with a single click of this tool. In case you have not selected any polygon (you clicked on area not interpreted) or you selected more than one polygon (clicked too close to polygon borderline) the program sends an error message. A bold outline appears around the selected polygon, which is helpful especially when splitting large or complex-shaped polygons. Bold outline can be switched off any time during drawing with popup menu's **Outline off** command. Instead of – or together with – bold outline you can also use polygon masking. This tool can be switched on with ***F7*** keyboard shortcut or **Polygon mask** button after first click (selection) with split tool, but before you begin to draw.

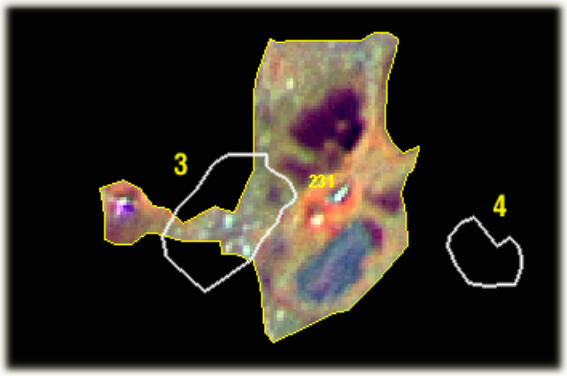
The new polygon's vertexes are defined with left clicks within the selected polygon's borderline. Vertexes can be deleted backward one by one with right clicking and choosing **Delete last point** command from the popup menu. Polygon drawing is finished with a double-click (the endpoint is a vertex, too).

If you wish to zoom in or out during drawing use popup menu's **Zoom in** or **Zoom out** command. In case the polygon stretches outside the area seen in the window, use popup menu's **Pan** command, which moves the content of the window so, that pointer is located at the centre of the window.

If a change area can delineate only on satellite images in **2000 window**, select polygon with ***Ctrl+click***. In this case the bold outline of the selected polygon appears in **2000 window** instead of **2006 window**. Program gives a warning message: *Draw the splitting line in 2000 window!* With help of satellite images for year 2000 you can draw the splitting line in the usual way. The result of the operation appears once again in **2006 window**.



Cases of successful polygon cutting out (naturally only one polygon can be drawn at a time):
The left diagram shows the polygon as drawn with the tool, the right diagram depicts the database polygon created. 1. cutting out an "island" polygon, 2. cutting out a polygon at borderline



Cases of unsuccessful polygon cutting out (bringing up an error message):
3. The selected polygon would be cut into three parts
4. The new polygon is drawn fully outside the selected polygon

The drawn polygon does not necessarily have to be an "island" (be fully inside the selected polygon). Only that part of the drawn polygon that is inside the selected one will make up the new

database polygon. The rest (outside selected polygon) will disappear. Thus outside the selected polygon you can draw the line on a simpler track. The program creates the cut out polygon only if it is made up of a single part. In case a multipart polygon would be created the program sends an error message and the drawing is unsuccessful. In the error message dialog box you can decide whether to continue or stop trying. If the created or remaining polygon is under the size limit, you are also given an error message. In this case you can decide whether you wish to execute splitting or not.

If you used the tool properly, the bold polygon outline and/or the mask disappears at the end of operation. If due to improper use they do not disappear, you can switch mask off with ***F7*** keyboard shortcut or **Polygon mask** button. Do not use this button before finishing the splitting operation or you exit the operation without performing the splitting! In this case the bold outline left can be erased with **Rewrite codes** command.

The two polygons created with this tool inherit the original polygon's CLC code, comment, remark and error data. When cutting out a non-island piece from a polygon either **Cut out polygon** tool and Split polygon tool can be used. Choose the tool that allows simpler operation with a smaller possibility of errors.

4.1.3. Unifying polygons

Unifying polygons is possible only in the CLC2000 database, in the **2000 window**. In **2006 window** the neighbouring polygons of a change area cannot be unified, not even if their new code is similar. The reason for this is that each polygon in the change database must keep its old code individually.

With the **Select polygon** tool tool select two neighbouring polygons you wish to unify. Select the first one with left click, the second with ***Shift+left click***. Same can also be used for deselecting a polygon. You can also select two polygons by dragging the selection box over them.

Once the two polygons are selected press ***F4*** key, choose **Union polygons** button or **Edit – Union polygons** menu command. The program sends an error message if you selected any number other, then two polygons or if the selected polygons are not adjacent. The program draws a bold outline around the area to be unified if polygons are properly selected.

Then a dialog box appears asking for confirmation. Check whether the right polygons are selected for unification. On answering *Yes* the program performs the operation.

The unified polygon inherits CLC code, comment, remark and error data – except *merge* error – from the larger polygon. A maximum of two polygons can be unified with one operation. Unification of more than two polygons requires more than one operation.

4.1.4. Deleting polygon

Polygons can be deleted only from the *Change database*, in the **2006 window**. In the *CLC2000 database* in **2000 window** you can only modify polygon borderline or change CLC code and you cannot delete a polygon.

With the **Select polygon** tool select the polygon(s) you wish to delete. Select the first one with ***left click***, the others with ***Shift+left click***. Same can also be used for deselecting a polygon.

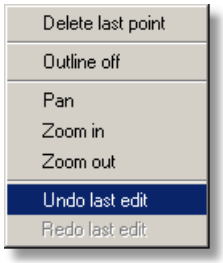
Once the polygons are selected press ***Del*** key, choose **Delete polygons** button or **Edit – Delete polygons** menu command. The program sends an error message if there is no polygon selected. The program draws a bold outline around the area to be deleted if polygons are properly selected.

Then a dialog box appears asking for confirmation. Check carefully whether the polygons selected for deleting are really the ones you wish to delete. On answering *Yes* the program performs the operation.

4.1.5. Undoing operation

Command for the last performed polygon editing operation can be withdrawn before performing a new operation with ***Ctrl+Z*** keyboard shortcut or with **Undo last edit** command in **Edit** or popup menu.

The undone operation can be redone – also before performing a new operation – with ***Ctrl+Y*** keyboard shortcut or with **Redo last edit** command in **Edit** or popup menu.



4.2. Editing CLC data

4.2.1. The CLC data window

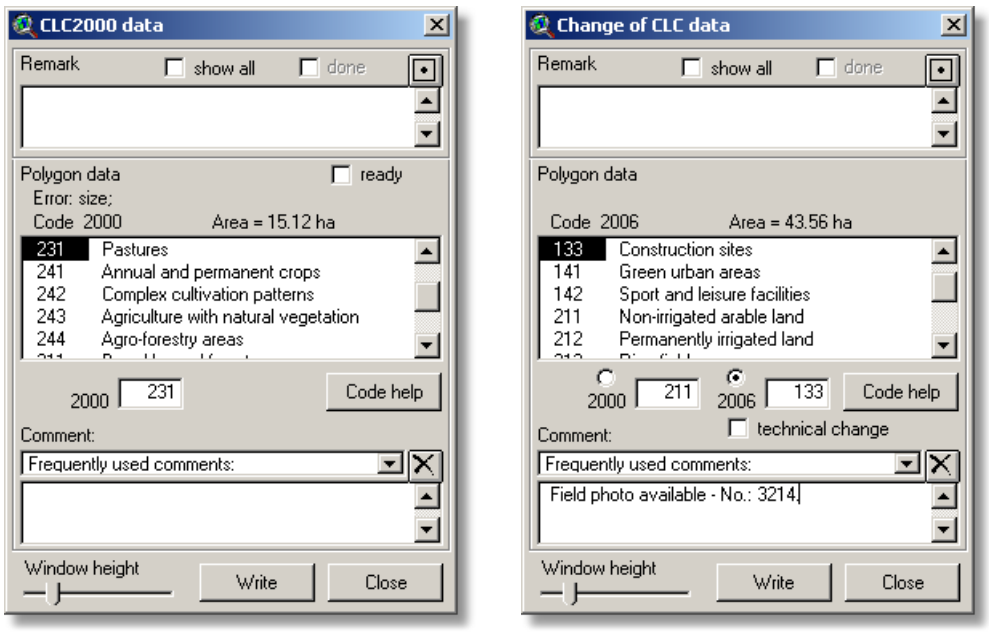
CLC data window serves viewing, specifying and modifying the data of individual polygons. The window can be opened with **CLC data window** button , the ***F9*** keyboard shortcut or the **View** – **CLC data window** menu command. When a single polygon is selected in the active view window, the CLC data window displays the data of this polygon. In other cases it appears with the default settings.

In the upper frame of the window you find supervisor remark information of the polygon (if any):

- remark number (selected/all) in polygon;
- *show all remarks* check box;
- remark done (fulfilled) checkbox;
- *Next remark* button;
- remark text;

In the lower frame you find polygon data:

- ready (approved) check box for CLC2000 polygons;
- errors of the polygon (if any);
- area of the selected polygon expressed in hectares;
- whole CORINE 1:100 000 land cover nomenclature with short name;
- for polygons in the CLC2000 database CLC2000 code;
- for polygons in the Change database CLC2000 and CLC2006 code,
  radio buttons for selecting editable code,
  technical change check box;
- button for opening CLC code help;
- list of most frequently used comments;
- text box for displaying and writing in a comment;
- button for clearing the comment text box.



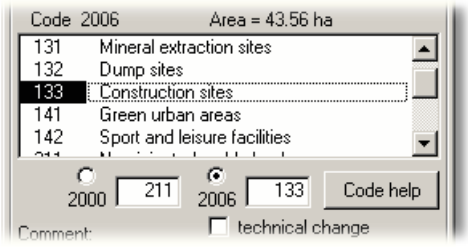
With the *Window height* slider you can adjust the size of the **CLC data** window by changing the height of *CLC code list*..

Write button writes the contents of the **CLC data** window into the database while *Close* button closes the window.

CLC data window covers a significant part of the screen. In the case of drawing, splitting, unifying or searching for large polygons or whenever you need a large screen area, it is recommended that you close this window. This can be done with the *Close* button, ***Alt+C*** keyboard shortcut or the close widget in the upper right corner of the window. When one of the View windows is active ***F9*** keyboard shortcut closes or reopens **CLC data** window.

4.2.2. Specifying the CLC code

With the **Select polygon** tool select the polygon whose data you wish to edit. When **CLC data** window is opened, the data of the selected polygon appear in it.



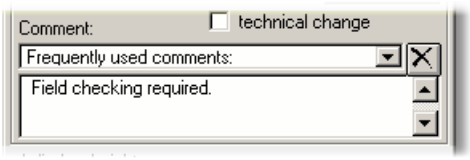
Select the line of the right CLC code from the list of category codes. The code number of the selected category appears in the *Code* text box. The fastest way of moving in the list to the required line is to drag and drop the slider of the scroll bar on the right. Detailed description of the selected code in the *CLC code list* is available by clicking on *Code help* button.

You can directly type the code number into *Code* text box without using the list. After each digit typed in, the program checks whether there are any existing CLC codes beginning with the given numbers. If there are, the program jumps to the first matching code and selects it. If you type in a wrong value, the program selects line *Invalid code* in the list. If a change polygon is selected, you can edit both code. Select appropriate radio button to enable desired code text box. If *technical change* check box is selected, you can't select *2000 radio button* or specify CLC2000 code, because in this case CLC2000 and CLC2006 codes must be identical!

4.2.3. Application of comments

During interpretation you might need to add questions or notes to a polygon then search for them. The *Comment* text box in **CLC data** window serves this purpose. The comment added to a polygon appears in this text box when the given polygon is selected.

The comment must not exceed 255 characters. To add a new comment or to modify an existing one you can select from the drop-down list of most common comments or type your comment in the text box. The comment selected from the drop-down list can be modified or completed in the text box. The *Delete comment* button on the right side of the list clears *Comment* text box.



You can find the list of most commonly used comment in the **`comment.txt`** file in **`Program`** directory. The list can be modified with help of any text editor program, such as Windows **Notepad**. In the text each paragraph forms a separate comment. First two comments (paragraphs) in the text must not be modified at any case!

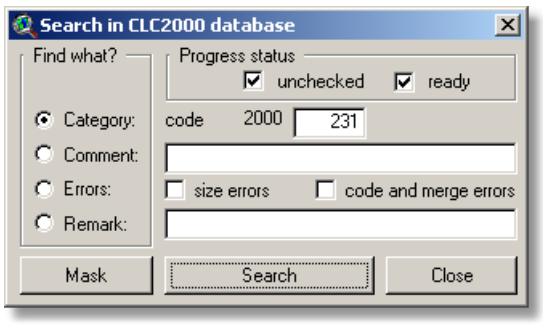
4.2.4. Writing the data

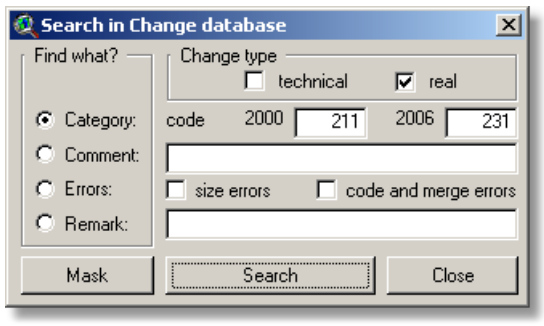
Content of the **CLC data** window is written into the land cover database with the *Write* button or ***Alt+W*** keyboard shortcut (if **CLC data window** is active). The program checks the data and the selected polygon before writing in and if finds any error, it sends an error message. If data matches the criteria, program writes data into the data table. The outline of the selected polygon flashes a few times during this procedure so you can check whether data are written into the right polygon. After writing in the data, the data table is saved into the corresponding **`.dbf`** file. The polygon is deselected and the **CLC data** window assumes default settings. In case you wish to continue editing the polygon data you have to select it again with the **Select polygon** tool.

4.3. Search

4.3.1. The Search window

Search window can be opened with the **Search** button , the **Search** command in **Edit** menu or the ***Ctrl+F*** keyboard shortcut. On the left side of the **Search** window you find *Find what?* radio button group, which specifies the search target. Further criteria (or the text searched after) can be specified for some of the searches. By searching in *CLC2000 database* you can specify progress status (unchecked and/or ready polygons), by searching in *Change database* you can specify change type (technical and/or real changes) too. After specifying criteria start search with the *Search* button.

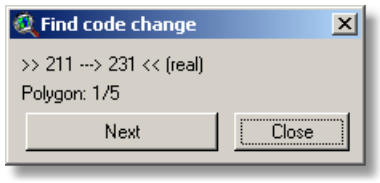




Next the program finds, selects and enlarges the first polygon matching the search criteria. In order to be easily identified the outline of the polygon flashes. The same time as the polygon is selected, the **Find xxx** window opens. In the header of the window xxx is replaced by the search target. The **Find xxx** window is always in front of all other windows, in the foremost position. First row of the window shows search criteria. Below that the serial number of recently shown polygon / number of all polygons found can be seen.

If you click on *Next* button, the next polygon found appears in the window. By clicking on *Next* button repeatedly the program goes round all polygons found, so after the last polygon it steps to the

first again. In case there are no polygons matching search criteria or there are no more polygons, because you have changed their data the program sends the following message: *Could not find!* After closing the **Find xxx** window you can still move to the next polygon matching the last search criteria with ***F3*** keyboard shortcut. InterChange program preserves the last search criteria for *CLC2000* and *Change database* separately. If **2000 window** is active, *F3* continues last search in *CLC2000 database;* or alternatively if **2006 window** is active, *F3* continues last search in *Change database.*

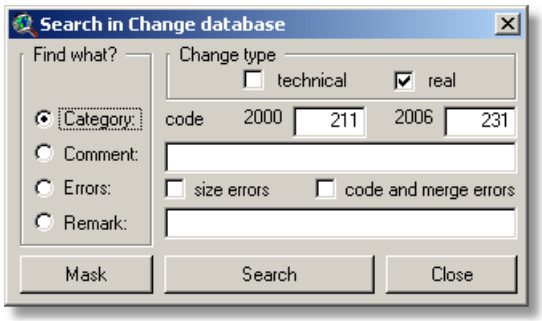


If you click on *Mask* button in the **Search** window, the program will mask out all polygons matching the criteria instead of jumping on matching polygons one by one.

In case you do not wish to start a search the **Search** window can be closed with the *Close* button or the close widget in the window's upper right corner.

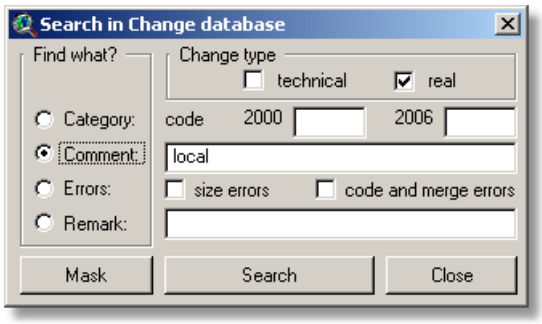
4.3.2. Search for CLC code

Open Search window and in the *Find what?* frame on the left select *Category* radio button. Type the wanted code into the *code 2000* text box beside the radio button. If **2006 window** was active before opening the **Search** window, you will find a *code 2006* text box as well. Thus in the change database you can search for code 2000, code 2006 or code change (code pair). Not only three-digit codes, but also one- or two-digit codes (eg. 11 –- Urban fabric) can be specified as search criteria. If you type in a non-existing code as search condition, the program sends an error message when starting search. When searching in *CLC2000 database* you can specify progress status (unchecked and/or ready polygons), when searching in *Change database* you can specify change type (technical and/or real changes) too. If *technical* check box is selected, program deletes the content of the code 2000 text box, because in this case CLC2000 and CLC2006 codes must be identical!



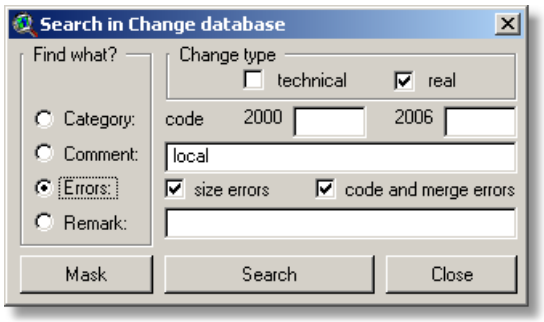
4.3.3. Search for comment

Open Search window and in the *Find what?* frame on the left select *Comment* radio button. Type a typical expression, word or word-fragment of the wanted comment into the *Comment* text box beside the radio button. If you wish to find all polygons with any comment, type * (asterisk) as wanted text into the text box. The program does not differentiate between lower and upper case letters during search. By searching in *CLC2000 database* you can specify progress status (unchecked and/or ready polygons), by searching in *Change database* you can specify change type (technical and/or real changes) too.



4.3.4. Search for data errors

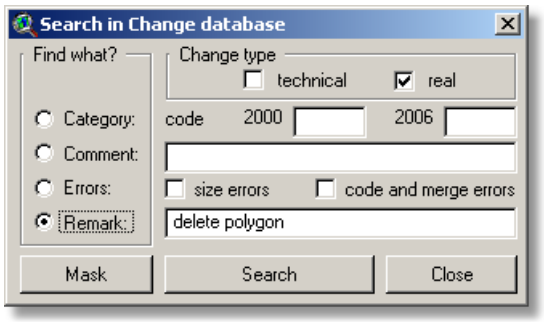
Open Search window and in the *Find what?* frame on the left select *Errors* radio button. Beside this radio button you find two check boxes to refine search criteria. If you select *size errors* check box, the program searches for polygons under the given size limit. (When creating change polygons or giving a code to them the program sends a warning message if the polygon is below size limit. If you still decide to keep these polygons, they will not be displayed during size error search.) If you select *code and merge errors* check box, the program searches for polygons with invalid category codes, and for neighbouring polygons with the same category code (only in *CLC2000 database*). On selecting both check boxes the program searches for both error types. If you fail to select at least one check box, the program sends an error message. By searching in *CLC2000 database* you can specify progress status (unchecked and/or ready polygons), by searching in *Change database* you can specify change type (technical and/or real changes) too.



Searching for polygon errors is recommended primarily after error checking, in order to search for errors found by the error checking. There is no point in searching for size error before error checking, because size and shape errors are written to the polygons' data records only during this procedure. Code error can be searched for any time, because code error is written to the new polygon's data record at the time of creation.

4.3.5. Search for remark

Search for remarks is needed only during the correction of mistakes revealed by quality control. Open Search window and in the *Find what?* frame on the left select *Remark* radio button. Type a typical expression, word or word-fragment of the wanted remark into the *Remark* text box beside the radio button. If you wish to find all polygons with any remark, type * (asterisk) as wanted text into the text box. The program does not differentiate between lower and upper case letters during search. After specifying criteria start search with the *Search* or *Mask* button.

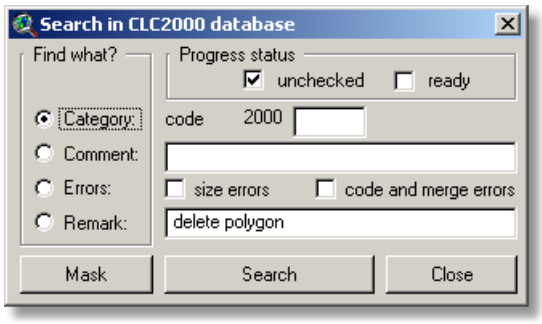


If remark theme is absent in the active view window, program displays a warning message. Otherwise finds and selects the first remark point matching the search criteria and displays remark text in CLC data window. If the found remark point is located in a polygon, program selects polygon too, and displays its data in the CLC data window. According to the setting of *show all* check box in CLC data window, search occurs among all remark points or only among the unchecked remark points.

4.3.6. Search for progress status

All searches within *CLC2000 database* can be restricted to polygons already checked or polygons not examined yet. To carry out these select the relevant one from *Progress status* check boxes. If you select both, the program searches among all polygons in *CLC2000 database*. If you miss selecting at least one, the program sends an error message.

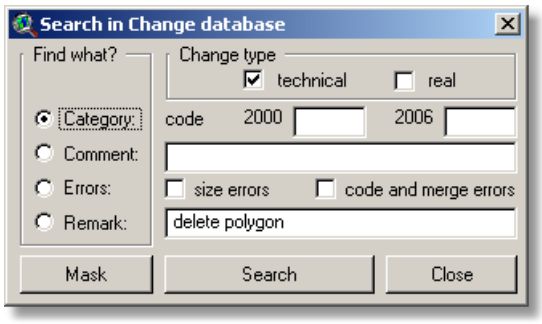
You can search for all checked or all not examined polygons too, regardless of their other characteristics. For this open Search window and in the *Find what?* frame on the left select *Category* radio button. Don't type any code into the c*ode 2000* text box beside the radio button. When clicking at *Search* button, program sends a warning, and begins the search for polygons with specified progress status flag.



4.3.7. Search for change type

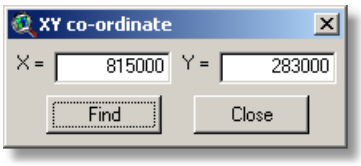
All searches within *Change database* can be restricted to technical change polygons or real change polygons. To carry out these select the relevant one from *Change type* check boxes. If you select both, the program searches among all polygons in *Change database*. If you miss selecting at least one, the program sends an error message.

You can search for all technical polygons too, regardless of their other characteristics. For this open Search window and in the *Find what?* frame on the left select *Category* radio button. Don't type any code into the c*ode* text boxes beside the radio button. When clicking at *Search* button, program sends a warning, and begins the search for technical change polygons.



4.3.8. Find XY co-ordinate

With the **Find XY** tool an arbitrary co-ordinate point can be find. On clicking this button the **XY co-ordinate** window opens. In this window you can type in the co-ordinates you are looking for. Clicking the *Find* button brings the given co-ordinates to the centre of the window and labels the location with a cross. The scale of the window does not change.

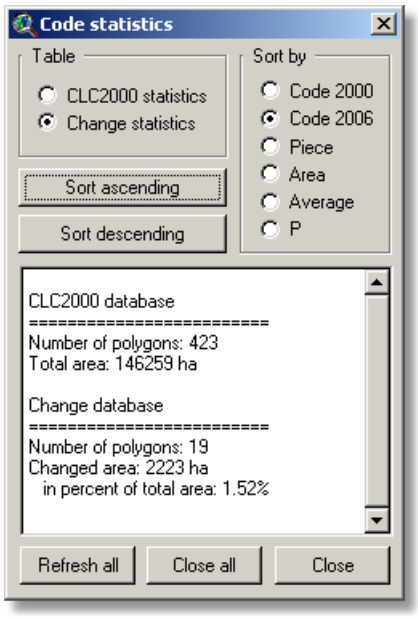


If the point specified in the **XY co-ordinate** window falls outside the area of the map sheet you are working on, the program sends an error message.

4.3.9. Code statistics

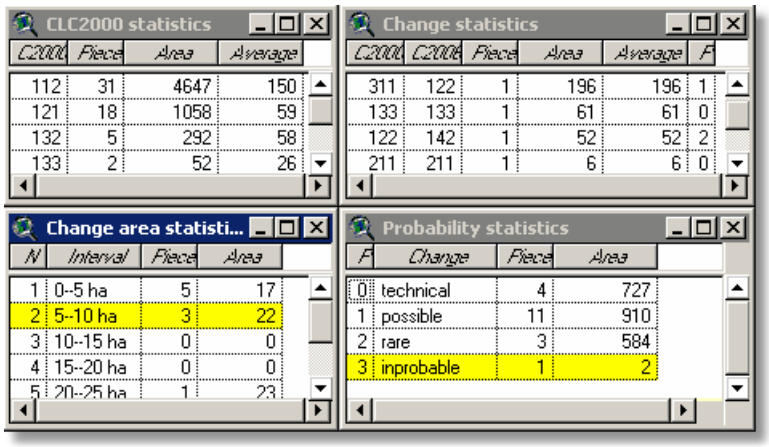
Select **Code statistics** button or the **Code statistics** command in **Edit** menu. As a result, the program calculates and displays four statistics and summary dialog. The appropriate **`.dbf`** files can be found in the mapsheet directory.

- In the **Code statistics** window you can see aggregate data of the *CLC2000* and *Change database*. You can simply select sorting method for **CLC2000 statistics** or **Change statistics**. *Refresh all* button recalculates all statistics, *Close all* button closes four statistical tables and the dialog too.
- **CLC2000 statistics** (**`stat2000.dbf`**) collects all different codes and lists them. It also counts how many polygons each code contains (*Pieces*) and calculates their total area (*Area*) and average area too (*Average*).
- **Change statistics** (**`statchng.dbf`**) collects all different Code2000–Code2006 pairs and lists them. It counts how many polygons each change pair contains (*Pieces*) and calculates their total area (*Area*) and average area too (*Average*).The last column of the table contains the probability of the given change type (*P*) built in the change probability table.
- **Change area statistics** (**`statarea.dbf`**) gathers change polygons into area intervals and shows how many polygons each interval contains (*Pieces*) and calculates their total area (*Area*) too.
- **Probability statistics** (**`statprob.dbf`**) gathers change polygons by change probability (*P*), counts how many polygons belong to each probability (*Pieces*) and calculates their total area (*Area*).



Possible values of *P* – probability of code change:

- 0 = technical change (Code2000 = Code2006), or code error (Code2000 = 0);
- 1 = probable change;
- 2 = rarely occurring change, careful checking recommended;
- 3 = improbable change, very careful checking and documentation recommended.


CLC2000 statistics
C2000 Piece Area Average
112 31 4647 150
121 18 1058 59
132 5 292 58
133 2 52 26
Change statistics
C2000 C2006 Piece Area Average P
311 122 1 196 196 1
133 133 1 61 61 0
122 142 1 52 52 2
211 211 1 6 6 0
Change area statisti...
N Interval Piece Area
1 0--5 ha 5 17
2 5--10 ha 3 22
3 10--15 ha 0 0
4 15--20 ha 0 0
5 20--25 ha 1 23
Probability statistics
P Change Piece Area
0 technical 4 727
1 possible 11 910
2 rare 3 584
3 improbable 1 2

If you double-click any row in a table, the program starts a search for polygons with the selected code, change type area or change probability respectively. This search method is especially useful for repeated checking of rarely occurring and almost improbable changes.

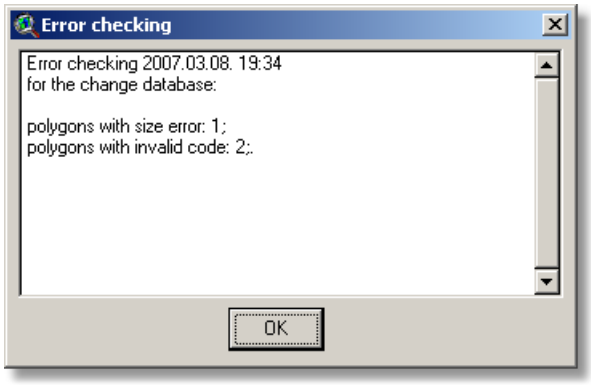
4.4. Error checking and correction

4.4.1. Starting error checking

If you follow the instructions of the printed user's guide and the pieces of advice in this help and you use **InterChange** program properly and carefully, then the created land cover database is not likely to contain errors. However, programs have an efficient error finding and correcting tool in order to filter the results of accidental mistakes. You should perform error checking and correction at least once, when you finish interpretation and before submitting your results. If you are not an experienced interpreter or you work on a difficult map sheet, it is useful to perform error checking a few times during interpretation.

You can start error checking by clicking the **Error checking** button or select **Error checking** command in the **Edit** menu. The program asks for confirmation. The operation starts on clicking *Yes.* If **2000 window** was active before starting error checking, then the program will check *CLC2000 database*, while it will check the *change database*, if **2006 window** was active before starting the operation. You can find detailed description of the individual error checking operations in the chapter *Special information*.

During error checking a progress bar can be seen at the bottom of the screen. While performing the most time consuming operations a *Stop* button appears beside the progress bar, thus you can stop error checking. The *Stop* button does not appear during shorter operations. Upon completing the error checking the program lists the number and type of errors found in an information window. If no error has been found, the program reports it in a dialog box. The result of error checking is written into a text file, too. You can find the text file in the map sheet directory under **`error_r.log`** name in case error checking was performed for the CLC2000 (**R**evision) database and under **`error_c.log`** name in case error checking was performed for the **C**hange database. Results of further error checkings are added to the end of these files.



4.4.2. Error correction

Open **Search** window and find the next polygon with error . After correcting the error (or even without it) you can jump to the next polygon with the *Next* button of the **Find next** window, or by pressing the ***F3*** key. The program jumps round the matching polygons cyclically, meaning that after the last polygon it jumps to the first (not yet corrected) one. If there are no matching polygons left, the program sends a message: *Could not find!*

Correction method of individual error types:

- In case of those polygons below size limit that you still wish to keep write in category code again and in the appearing dialog box choose keeping the polygon.
- Unneeded small polygons in the CLC2000 database must be unified with one of their neighbours during the correction. In the change database simply delete unneeded small polygons. Those extremely tiny polygons that were created by mistake along polygon borderlines might not be visible unless you zoom in on them a lot.
- Polygons with code error should be corrected by giving a category code to them.
- Neighbouring polygons with the same category code in the CLC2000 database have the error type *merge*. These polygon pairs should be either unified or the code of one of them changed.

The operations above delete the corresponding bit from the error code, and the error type text from the error field. With error colouring you get an overview of the number and position of polygons with error.

5. The interpretation process

5.1. General advice

When working with smaller performance computer on a map sheet containing a lot of polygons, some editing and search operations might need significant time. Be careful that in the meantime you do not strike a further key or start a new operation. Always wait until the program fully performs the operation started and its result appears on the screen!

The program does not perform an automatic save after polygon editing operations, because that would make the use of undo command impossible. Periodically save your project while editing it!

For maximum data safety it is recommended frequently backup the CLC2000 and change databases from **`Revision`** and **`Change`** subdirectory of each map sheet directory.

5.2. Saving workspace

In case you wish to return later to a given part of the map sheet, you can save the temporary view (co-ordinates and scale) of the window with **Save workspace** button , **Edit – Save workspace** menu command or ***F11*** keyboard shortcut. After this you can move or zoom on the map sheet as you wish. When you want to return to the workspace saved, click **Restore workspace** button , select **View – Restore workspace** menu command or use ***F12*** keyboard shortcut to restore the workspace (area and scale) you last saved.

The file containing data of the workspace is saved to the given map sheet's working directory. Thus a separate workspace can be saved for each map sheet and can be restored any time later.

5.3. Order of operations

Revision and correction of CLC2000 database

The revision of CLC2000 database, which is found in the **2000 window**, should be done before beginning to interpret changes. For revision always use satellite images in the **`Revision`** directory taken around 2000! Maximise **2000 window** with the **Tile windows on/off** button while revising the database. After you have finished revision start error checking and correct errors found. Repeat this procedure until no more errors are found in CLC2000 database.

Interpreting changes, creating change database

After finishing the revision of CLC2000 database, divide screen between **2000 window** and **2006 window** with **Tile windows on/off** button and perform change interpretation. Systematically examine the whole area, all the polygons of the map sheet whether they contain changes. If more satellite images are available for the year 2006, check for changes on all of them. Check whether the change matches interpretation criteria.

Before beginning to create change polygons in a given area, check the affected CLC2000 polygons whether they need further correction. If you classify the affected polygons as correct, create the change polygons on the basis of satellite images in the **2006 window**. Creation of change polygon consists of the following steps:

1. take over CLC2000 polygon containing a change into the *Change database*
2. cut out change area from the polygon taken over;
3. delete the unchanged part of polygon taken over;
4. specify the new code of remaining change polygon.

Program **InterChange** facilitates these operation significantly. A given CLC2000 polygon might of course contain more than one change area. If this is the case, steps 2 and 4 must be completed for all change areas. To monitor the status of the work you can give a “ready” status to a CLC2000 polygon if you have examined it, and all its changes have been delineated.

It is not recommended to carry out corrections in the *CLC2000 database* on the given area once you interpreted changes. If however later you happen to find mistakes in a CLC2000 polygon that already has a change polygon on its area, the program might delete change polygons depending on the type of correction made. In this case you have to create the change polygons again. If you modify *CLC2000 database* while already working on change database, you have to repeat error checking and correction on them.

Switching on status colouring you can check the progress made in change detection. Perform error checking and correct errors in the change database after you have finished change detection. Repeat this as long as the program finds any errors. Even after this it is recommended to check each change polygon once more. Pay special attention to checking and documentation of rarely occurring and improbable changes!

Submission and control

As interpreter finished interpretation he/she have to submit the **`.shp`**, **`.shx`** and **`.dbf`** files from **`Revision`** and **`Change`** subdirectories of each interpreted map sheet as a result. Central team controls databases and documents the errors and mistakes. If the original interpreter corrects the mistakes, he or she must read the remarks of the supervisor and implement corrections.

5.4. Revision of CLC2000 database

The following cases might occur during the revision of CLC2000 database:

- The polygon has wrong code. Modify code in **CLC data** window.
- A polygon must be cut into pieces and be re-coded. Use Split polygon or Cut out polygon tool to perform the operation.
- You have to unify more polygons into one. Use Union polygons command.
- Polygon borderline has to be modified. In **2000 window** there is no tool for deleting and re-drawing polygons. Borderline modification must be carried out with the Split polygon and the Union polygons tool. However, with these tools only one piece of area can be "moved" from one polygon to the other at a time. If you have to modify two polygons' borderline at more points, a more effective method is unifying the polygons first then splitting them along the right borderline again. This case though you have to specify again the smaller polygon's code, because it is changed during unification.

5.5. Interpreting changes

If it is not obvious at first sight whether a change area is large enough to be interpreted, measure its area with the Area tool before interpreting it. While using this tool you also get further pieces of advice on the steps of interpretation. In case you interpret a narrow patch, be careful to check width with the Distance tool.

In the **2006 window** click with the **Select polygon** tool to the area where you observed a change or to the polygon you examined. A dialog window appears asking a question: *Take over selected polygon to change database?* There are four choices:

- **Yes, take over.** – The program copies the CLC2000 polygon containing a change into the change database. Then you can cut the area of actual land cover change from this polygon.
- **Yes, take over and classify as ready.** – The program takes over the polygon to the change database and writes in the "ready" classification to the CLC2000 polygon's data record. During the creation of change database you have the possibility to classify as ready those CLC2000 polygons that you have examined. This option should be chosen only if the whole area of the polygon has been thoroughly examined. It is not recommended to use it in case of large polygons.
- **No, only classify as ready.** – The program writes in "ready" classification into the CLC2000 polygon's data record. The option should be chosen only if you have examined the whole area of the polygon and there are definitely no or no more change areas in it. It is recommended to use in two cases: **a)** small polygons without any changes; **b)** large polygons containing several change areas, after all changes have been interpreted and the whole polygon is examined again.
- **No, only delete ready classification.** – Choose this option if you classified a polygon ready by mistake or if you have doubts about the polygon and you find necessary to check it later.

Use Split polygon or Cut out polygon tool for splitting up polygons taken over to change database in order to create change polygons. While performing splitting consider warnings on polygons under size limit created. Always delete unneeded pieces of the split polygon (areas that have not changed) with Delete polygons tool and keep only change areas! Specify the change polygon's new code in **CLC data** window.

6. Quality control

6.1. The control procedure

As a result of interpretation you have to submit the **.shp**, **.shx** and **.dbf** files from the **Revision** and the **Change** subdirectory. A further technical control of these databases with a computer and a thematic control by another expert is highly recommended.

For thematic control, a slightly different program called **InterCheck** – part of CLC2006 Support Package – should be used. The controlling expert (supervisor) can put down his/her notes on mistakes and correction suggestions for the interpreter/corrector in the *Remark database* created by InterCheck program. During thematic control the remarks referring to polygons or to individual points of the map sheet are written in this database.

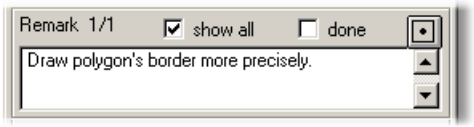
Using CLC2006 Support Package, thematic control and correction based on supervisor's remarks is simple to carry out and also to repeat several times during interpretation procedure. In case the interpretation made with **InterChange** and thematic control is made by **InterCheck** the same single directory structure and files can be used throughout the production procedure. Copying or moving of files is not necessary. The two actions – interpretation and control – only reads but never overwrites each other's data. Naturally, interpreter and supervisor should never work simultaneously on a single map sheet. In order to ensure maximum security it is highly recommended to regularly make backup saves of CLC2000 and change data files (containing the results of work) from each map sheet's **Revision** and **Change** directory.

6.2. Correction after control

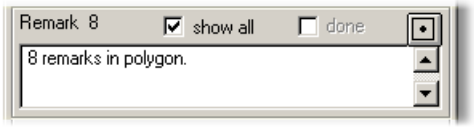
During thematic control the supervisor creates two ArcView shapefile format point databases with help of **InterCheck** program and writes his or her remarks and recommendations into text fields belonging to each point. Files **Remark_r.shp**, **.dbf**, **.shx** created in **Revision** subdirectory of the concerned map sheet contains remarks on CLC2000 database, while files **Remark_c.shp**, **.dbf**, **.shx** in **Change** subdirectory contain remarks on the change database.

In order to correct them, remarks can be imported to the corresponding view window by clicking on **Import remarks** button or choosing the **Edit – Import remarks** menu command. The two remark databases can be imported separately as in certain phases of the work only either CLC2000 or the change datbase is under supervisor control, creating only one database at a time.

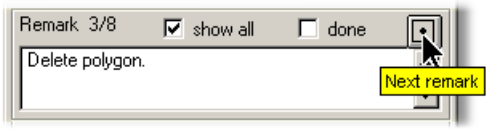
Single remark points can be selected by clicking on them with the **Select polygon** tool. Selected point is marked by its yellow colour meanwhile the remark's text is displayed in remark text field of the **CLC data window**.



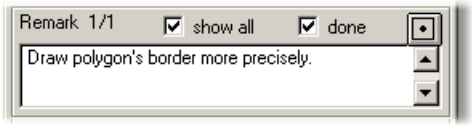
In CLC2000 database all remark point necessarily fall into a polygon's area. In change database however, remark point might also be out of any polygon's area, for example in a change area that the interpreter missed to delineate. If selected point falls into a polygon's area, the program selects the polygon itself as well, also displaying its data in the CLC data window. If a polygon contains a remark, its text is displayed when selecting the polygon the same way as if the point itself would have been selected. One polygon might contain more than one remark point. When selecting such polygon only the number of included remarks is displayed in the remark textbox.



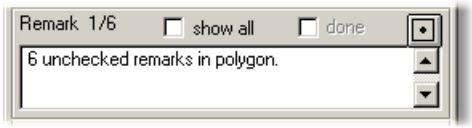
You can view the text of these remark points jumping along the points one by one by clicking on the *Next remark* button in upper right hand corner of the text field. During this the serial number of currently selected point / total number of points in the polygon is displayed beside the *Remark* label.



Processing and fulfilling the action requested in the remark can be registered by clicking on the *done* checkbox in CLC data window. The program immediately writes *done* attribute to the point's data record and the colour of the point turns from red to green. The *done* status can be deleted again with help of the checkbox after selecting such point again.



In case you want only those remarks to appear on the screen that still wait to be fulfilled and the processed ones to disappear, switch off by clicking the *show all* checkbox. In switched off status of *show all* checkbox only red remark points appear on the screen, the *Next remark* button jumps to the next unchecked point within the polygon and search tool finds also only the unchecked points when searching for remarks.



6.3. Handling remarks

This list of most frequently used remarks describes in which cases the quality supervisor uses a given remark and how should it be handled during correction.

Questionable code, check it.

This remark used only in the CLC2000 database. The code cannot be specified on the basis of available satellite images. More information is needed for deciding which code to use.

- Correction:

Check by fieldwork, ask for information by phone or specify the code on the basis of other information. Additional information should always be documented.

Wrong code, suggestion:

This remark used only in the CLC2000 database. The code given by the interpreter is definitely incorrect on the basis of available satellite images. After the colon the proposed correct code should be given.

- Correction:

Modify code or document clearly why you think your code is correct.

Unify polygon with neighbour, whose code is:

This remark used only in the CLC2000 database. Polygon should be unified because

- it is smaller than the size limit and there is no reason to keep it;
- its land cover does not differ from its neighbour's.

In case the polygon has more than one neighbour (so it is not an island polygon) the code of the polygon to be unified should be given after the colon.

- Correction:

Unify polygon with the specified neighbour with the Union polygons tool.

Split polygon.

The polygon consists of two or more areas with different category codes. Remark may also include the recommended way of splitting and the code of polygons to be created.

- Correction:

Split the polygon with the Split polygon or the Cut out polygon tool then modify the codes of the parts according to the suggestion.

From inside the polygon cut:

Used in case of – usually large – polygons that include small land cover patches that the interpreter failed to outline.

- Correction:

The specified locations can be found with help of the XY co-ordinate button in the **CLC data** window. Draw the new polygon with the Cut out polygon tool and give CLC code to it.

Draw polygon's border more precisely.

The polygon borderline is inaccurate, does not properly match the patch of land cover category in the satellite image.

- Correction:

Correct polygon borderline. Borderline modification in *CLC2000 database* must be carried out with the Split polygon and the Union polygons tool. However, with these tools only one piece of area can be "moved" from one polygon to the other at a time. If you have to modify two polygons' borderline at more points, a more effective method is unifying the polygons first then splitting them along the right borderline again. This case though you have to specify the smaller polygon's code again, because it is lost during unification.
For borderline modification in Change database delete then polygon with the Delete polygons tool and recreate it, finally give CLC code to them.

Re-interpret the area.

This remark refers to an area, usually covered by several polygons, that is misinterpreted and there are several border or code mistakes in it. Remark might include explanation or if required a more detailed description can be read in the report.

- Correction:

In CLC2000 database unify the specified polygons in the given area with Union polygons tool then interpret the area again according to recommendation with Split polygon tool or Cut out polygon tool, finally give CLC code to them.
In CLC2006 database delete the specified polygons in the given area with Delete polygons tool then re-create the the change polygons, finally give CLC code to them.

Missing change.

This remark used only in the change database. The interpreter failed to outline the change area.

- Correction:

Create required change polygon.

Impossible change.

This remark used only in the change database. The code change given by the interpreter is definitely improbable (e.g. 111 –-> 211).

- Correction:

Modify code or Delete polygon from change database.

Wrong change code pair. Proposed change from 2000 to 2006:

This remark is used only in the change database. The old and/or new code given by the interpreter is definitely incorrect on the basis of available satellite images. After the colon the proposed correct code pair should be given.

- Correction:

Modify code or document clearly why you think your interpretation is correct.

Not a real change. Proposed code in both dates is:

This remark is used only in the change database. The change polygon does not outline a real change. After the colon the proposed correct code should be given.

- Correction:

Delete polygon from change database, and – if necessary – modify original code in CLC2000 database; or document clearly why you think your interpretation is correct.

Delete polygon:

This remark appears only in the change database. The polygon should be deleted because

- it is smaller than the size limit and there is no reason to keep it;
- it does not outline a real change;

- Correction:

Delete polygon with the Delete polygons tool.

Technical change.

This remark used only in the change database. The change area should be marked as technical change.

- Correction:

Mark change area as technical change.

Further remarks are logical combinations of the ones listed above.

7. Information support

7.1. Code labels

7.1.1. Handling code labels

Switching off and on code labels

In areas with a lot of relatively small polygons the code labels might disturb the interpreter during interpretation. In these cases code labels can be switched off on the screen with **Toggle codes** button , the **Toggle codes** command in the **View** menu or with the ***F5*** keyboard shortcut. Repeating the command, code labels are switched on again. This command does not refresh the content and position of labels, so they will appear at the same position as before switching off.

Manual code labelling

ArcView places code labels in the geometric centre of the polygon. Therefore sometimes it is difficult to find the code label of polygons that are large, have complicated shape or concentric position. The labels might fall outside the view as well. In order to solve this problem you can manually place code labels on any part of the polygon. Choose **Label** tool . Click at the required location inside the polygon and its code appears at that location. This way you can place several code labels within a polygon. These manual labels stay there when you switch labels off and on, but they disappear after you perform any polygon editing operation or refreshed code labels. **Label** tool works in **2000 window** with *CLC2000* database, in **2006 window** with *Change* database.

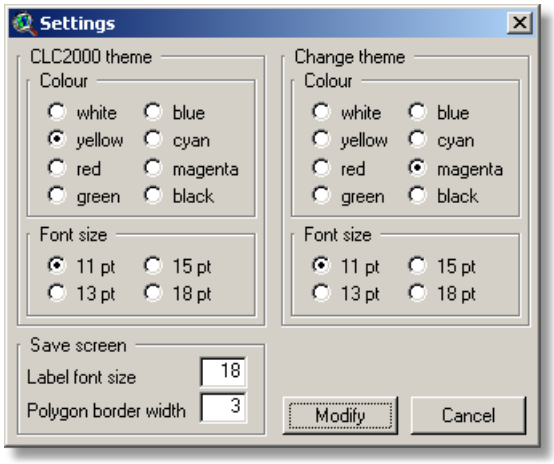
Rewriting code labels

After significant zooming in or out code labels might appear outside the polygon they belong to. This case you can delete and rewrite them with the **Rewrite codes** button , the **Rewrite codes** command in the **View** menu or the ***F6*** keyboard shortcut. This operation is automatically performed each time after you edit polygons or you write in polygon data to the table.

7.1.2. Setting label properties

The optimal font size of code labels depends on the size, quality and resolution of the monitor used during interpretation. Sometimes you might need to change the colour of code labels and polygon outlines because of significant differences within satellite images.

You can open **Settings** window with the **Settings** button or the **Edit** – **Settings** menu command. When opened, the window shows settings of the CLC2000 and Change themes. The code label and polygon outline colours and the code label font size can be modified with radio buttons as well. In *Save screen panel* polygon outline width and code label font size can be set for creating screen shots for documents and reports. *Modify* button performs the selected modifications. *Cancel* button closes the **Settings** window without performing modifications.

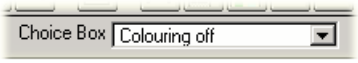


Colours should be chosen so that the lines stand out best in front of the area just being interpreted. This depends very much on the quality and settings of the monitor used. In most of the cases default

yellow and magenta are the most suitable. It is recommended to set different colours for CLC2000 and change database.

7.2. Colourings and masks

7.2.1. Colouring of polygons



On the right side of the toolbar you find **Polygon colouring** (labelled as *Choice Box*) drop-down list, which allows you to switch on polygon colourings. The colouring can be switched off with selecting the *Colouring off* line in the list, the **Colouring off** button , the **View – Colouring off** menu command or the ***F8*** keyboard shortcut.

Colouring polygons by errors

Polygons appear in different colours according to their error type: invalid (missing) code, size error and both errors. During error correction you get an overview of the position and number of polygons with error. Code errors are up-to-date, while size and shape errors are up-to-date only right after running error checking.

Colouring polygons by CLC codes

One of the applications of the finished database is producing maps. This colouring shows polygons according to the internationally set CLC colour coding. Selecting this colouring the polygons appear in colours specified for the third level (three digit) CORINE categories, zero coded polygons are white. Before switching this colouring on it is recommended to switch off the visibility of background satellite images.

Colouring CLC2000 polygons by status

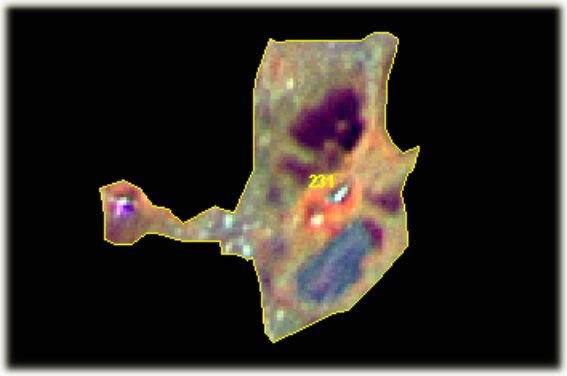
While creating the change database there is a possibility of classifying CLC2000 polygons as ready, if the whole area of the polygon is checked. Status colouring shows these polygons in light grey, while polygons yet to be checked remain transparent. Thus you can check how much progress you have made in the change detection and where there are areas yet to be worked.

Colouring change polygons by probability of change

To each change type (pair of old code – new code) belongs a value indicating the probability of that land cover change. Change colouring shows polygons with code error (zero code) and technical change polygons in red, area of probable changes in grey, area of rarely occurring changes in yellow and the area of improbable changes in magenta. This colouring draws attention to areas of less probable changes, which should be checked and documented with special care.

7.2.2. Polygon mask

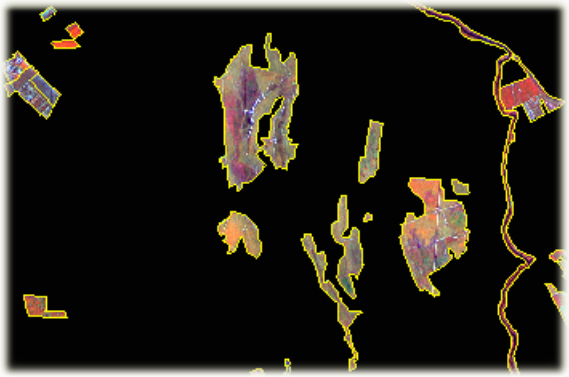
A black mask around selected polygons can be switched on or off in the active View window with the **Polygon mask** button , the **View – Polygon mask** menu command or the ***F7*** keyboard shortcut. When the mask is switched on, only the selected polygons are visible, the rest of the view is black.



Polygon mask is especially useful in avoiding mistakes when splitting or cutting out a polygon. It is also a helpful tool when you examine polygons with complicated shape and you want to eliminate the disturbing presence of surrounding polygons.

7.2.3. Searching with help of mask

Set the search conditions in Search window then click *Mask* button. This case the program will set off matching polygons with a black mask on their environment instead of jumping on them one by one. You can move or change scale on the masked area at will. If you do not need the mask any more you can switch it off with the **Polygon mask** button , the **View – Polygon mask** menu command or the ***F7*** keyboard shortcut.



Searching with mask is especially useful when looking for polygons with some similar features. It can also be helpful when at an advanced state of work you are looking for polygons you still have something to do with. With this method you can find polygons with:

- the same category code or change type;
- any comment or remark;
- a given key word (e.g. "field checking") in the comment or remark text;
- a given error type.

7.2.4. Save screen tool

Compilation or illustration of reports, documents, computer demonstrations might make necessary creating screenshots from certain parts of the map sheet. Due to resizing thin polygon boundaries and tiny code labels are very often hardly if at all visible and readable on these saved images. In case you want to make such screenshot for documentation purposes select the **Save screen** tool. As a result, the program increases polygon boundary width and code label font size. These parameters can be freely modified in the **Settings window**.

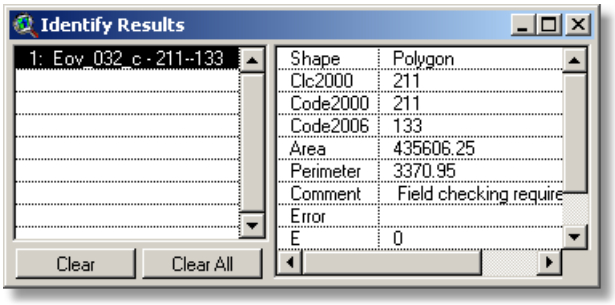
Modified settings are kept even if you use the **Label**, the **Magnifier**, the **Reducer** or the **Pan** tools, with help of which you can adjust the view to be saved. If the view is adjusted, save it to the clipboard by pushing ***Ctlr+PrintScreen*** keys. Open an image editor or word processor program, paste image into a document and save to disc.

In order to continue work, choose **Identify**, **Distance**, **Area**, **Select polygon**, **Cut out polygon** or **Split polygon** tool. This will reset the settings: polygon boundary width and code label font size is readjusted according to original settings.

7.3. Information providing tools

7.3.1. Identify tool

The **Identify** tool in the toolbar provides the same service as in ArcView. Clicking with it in **2000 window** or **2006 window** opens **Identity results** window, which provides detailed information on the polygon you clicked on in the active theme. If the desired theme is not active, activate it with a sigle click on its name in the windows' left side in the legend stripe. In **Identity results** window on the left you can read the name of the polygon, while on the right all data belonging to it in the table.



7.3.2. Size check tools

Checking width

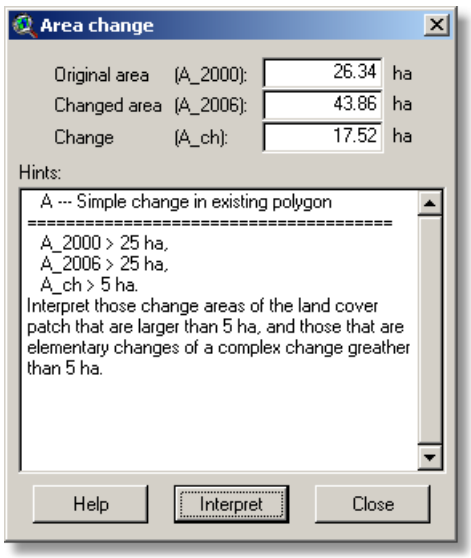
Distance tool serves the checking of a land cover patch's or a polygon's width, to make sure whether it is above width limit. Begin the line to be measured with a single click. As you move the pointer, the distance between start point and the pointers position in metres can be seen in the status bar at the bottom of the screen. With further clicks you can define the total length of a broken line as well. Finish length measurement with a double click. The length of the last section and the line's total length remains visible in the status bar.

Estimating polygon area and change area

Interpreting a change area might require a long time and it might happen that during editing the polygon proves to be small and it ends up that it should not have been interpreted. For this reason it is useful first to examine with the quick **Area** tool whether it is worth beginning at all the editing operation. Outline roughly the area of the polygon you wish to create with the tool. Vertexes can be drawn with left mouse click and last points can be deleted with right click. Popup menu commands are available here, too. Upon closing line with a double-click, in the status bar you can read the area of the outlined part in hectares. The area of existing polygons can be found out without drawing if you click on the polygon with ***Ctrl*** key held down. ***Ctrl+click*** method works for CLC2000 database polygons in **2000 window** and only for change database polygons in **2006 window**.

Area tool can also be used for estimating change areas. To compare the area of a changed land cover patch in both window,

- first outline the patch in the **2000 window** on the CLC2000 satellite image – or if it already exists as a polygon in CLC2000 database, use ***Ctrl+click*** for selection. The area of the original patch in hectares appears in status bar.
- Next outline the changed area of the land cover patch in the **2006 window** on the CLC2006 satellite image – or if it already exists as a polygon in Change database, use ***Ctrl+click*** for selection. In the status bar appears the area of the changed patch. At the same time **Area change** window opens and shows the area of original patch (first measure), the area of the changed patch (second measure) and the size of change. In **Area change** window you can see the change type too. In *Hints* text box you find short instructions on how the given change should be interpreted.


Area change
Original area (A_2000): 26.34 ha
Changed area (A_2006): 43.86 ha
Change (A_ch): 17.52 ha
Hints:
A --- Simple change in existing polygon
A_2000 > 25 ha,
A_2006 > 25 ha,
A_ch > 5 ha.
Interpret those change areas of the land cover patch that are larger than 5 ha, and those that are elementary changes of a complex change greather than 5 ha.
Help
Interpret
Close

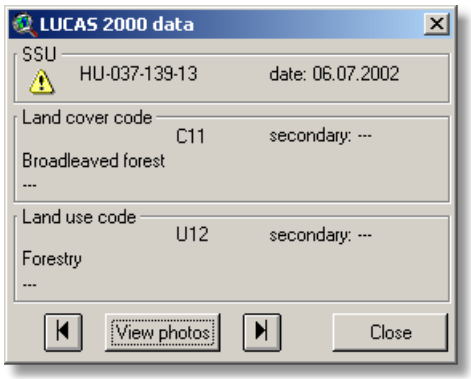
Help button (***Alt+H***) opens the corresponding help topic. The window can be closed with two buttons. The default button out of the two is always the one, whose use is the most likely according to the *Hint'* s text. Instead of clicking on it, the default button can be operated quicker with striking the *Enter* key. Both buttons have a keyboard shortcut, too.

- Use *Interpret* button (***Alt+I***) if you have to interpret the change area according to the *Hints* text. On selecting this button **2006 window** and **Select polygon** tool will become active.
- With *Close* button (***Alt+C***) the program restores the state before the window was opened. Last used window and **Area** tool will become active.

7.3.3. LUCAS data window

When opening a map sheet for the first time program checks if there are **`LUCAS00.shp`** and/or **`LUCAS06.shp`** files in the **`LUCAS`** directory found on the same directory level as map sheet directories. If LUCAS data are found they are loaded into the corresponding view window.

Data belonging to LUCAS points might serve as useful ancillary data during change mapping. The full data content belonging to a LUCAS point can be displayed with the **Identify tool** . In case the information found in LUCAS data window strongly contradict the satellite image, check this additional information on the LUCAS point. High observation distance, low GPS accuracy and non-field observation might be the cause of disagreement between LUCAS information and the satellite image. However, usually only certain data are needed during change mapping. These can be viewed if you select the required LUCAS point by ***Ctrl+clicking*** with the **Select polygon** tool. If LUCAS data window is not opened yet, the program opens it and loads in it the most important data of the selected LUCAS point. These are as follows in the order of their appearance:



- LUCAS point ID;
- date of surveying;
- in case of low data accuracy only a warning icon (use **Identify tool** for further information);
- primary and secondary land cover code and their text description;
- primary and secondary land use code and their text description;

LUCAS data window and **LUCAS photo viewer** – instead of **`LUCAS00.shp`** and/or **`LUCAS06.shp`** files – can only use specific LUCAS data files, created with help of **InterPrepare** program!

LUCAS2000 points are located in groups of ten. You can jump from one point to the next/previous with help of arrow buttons in the bottom of the LUCAS data window. LUCAS2006 points have a scattered, non-regular distribution, so for this database arrows are not applicable. The *View photos* button starts an external program called **LUCAS photo viewer**. **LUCAS photo viewer** displays the main data of the currently selected LUCAS point as well as the field photographs belonging to the point, if any. The default position of **LUCAS photo viewer** program window when inactive is the bottom right corner of the screen covering as small part of ArcView's working area as possible. Detailed information on the use of **LUCAS photo viewer** can be found in the program's own help. *Close* button of **LUCAS data window** closes both LUCAS windows.

7.4. Help system

7.4.1. General help

General InterChange help

The general InterChange help you are just reading can be opened with the **Help – InterChange help** menu command or the **InterChange help** button [?] in the button bar. The help window is similar to that used in Windows programs. You can choose a help topic in the Contents or search for key words and expressions in the help index.

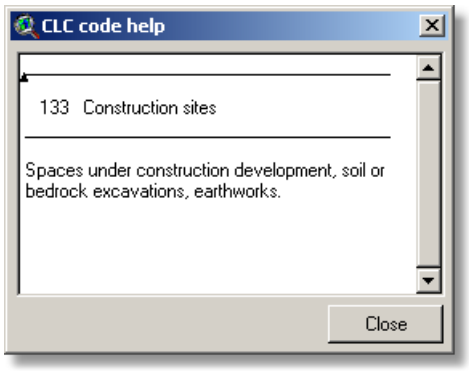
Context-sensitive help

On clicking **>>What is this?<< help** button in the button bar the cursor changes its shape. Click on any button, tool or menu command with this question marked cursor and the general help window opens with information on the selected control element. The cursor then assumes its former shape so you have to click **>>What is this?<< help** button again in order to ask specific information again.

If you click with question marked cursor on a control in any InterChange dialog box (**CLC data**, **CLC code help**, **Search**, **Settings**) the corresponding help topic appears. If any of the above dialog boxes is active, ***F1*** key can also be used to open the corresponding help topic.

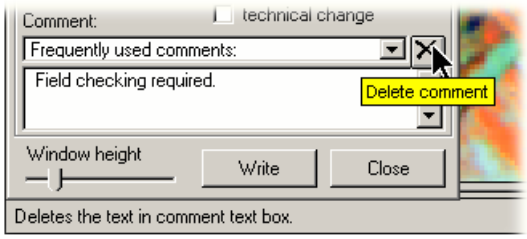
7.4.2. CLC code help

CLC code help window can be opened by clicking on *Code help* button in the CLC data window. It gives you a detailed description of the category code selected in the code list. **CLC code help** window can be dragged and resized at will. It is always placed in front of the other windows, so it is recommended to close it with *Close* button when not needed any more. As long as this window is opened its content follows the changes of *CLC code list* in **CLC data** window.


CLC code help
133 Construction sites
Spaces under construction development, soil or bedrock excavations, earthworks.
Close

7.4.3. Popup texts and status bar

If you need more information on controls created or modified in InterChange program, you can find it in the popup texts and in the status bar at the bottom of the screen. Popup text and status bar help appears, if you moves the mouse pointer over a control.



8. Keyboard shortcuts

8.1. Keyboard shortcuts

If 2000 or 2006 window is active

F1	context-sensitive help
F2	select tool
F3	find next matching polygon
F4	union poligons
F5	code labels off/on
F6	refresh code labels
F7	polygon mask on/off
F8	colouring off
F9	open or close CLC data window
F11	save workspace
F12	restore workspace
Back	zoom to previous extent
Del	delete polygon
Ctrl + S	(**F**ind) open Search window

Tool shortcuts after **F2**:

0	Identify
1	Distance
2	Area
3	Label
4	Magnifier
5	Reducer
6	Pan
7	Select polygon
8	Cut out polygon
9	Split polygon

If CLC data window is active

Alt + H	CLC code **h**elp
Alt + W	**w**rite in data into the database
Alt + C	**c**lose CLC data window

If Area change window is active

Alt + H	open **h**elp for change interpretation
Alt + I	continue with change **i**nterpretation
Alt + C	**c**lose Area change window

9. Special information

9.1. Directory structure

Change detection with **InterChange** program requires a pre-defined directory structure, which has to be built up for all interpreters. This structure can be easily created with help of **InterPrepare** program, part of CLC2006 Support Package.

This directory structure can then be copied to any optional place on the hard disc of the computer used by the interpreter. Interpreters may receive the directory structure built for them either on CD or any high storage capacity data medium, or they might download it through a sufficient fast network.

Within the directory structure the **`Program`** directory contains the files needed for running InterChange program. In **`Doc`** directory you will find InterChange's printable documentation in PDF format, printable keyboard template and other written information. A separate subdirectory belongs to each map sheet to be interpreted. The name of this subdirectory is recommended to refer to the topographic identification of the map sheet or working unit, but must not exceed 7 characters.

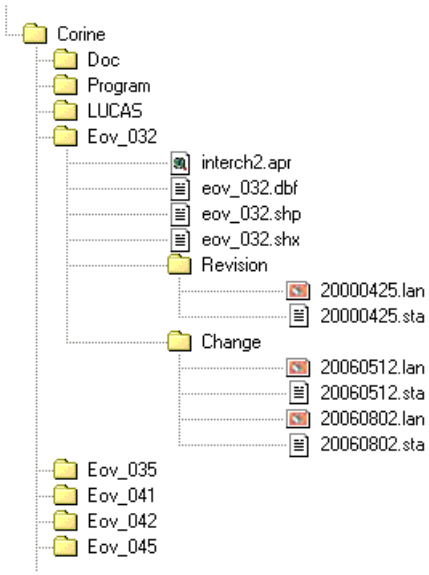
`LUCAS` directory contains *LUCAS2000* and *LUCAS2006 point databases* in ArcView shape file format, with names **`LUCAS00`** (**`.shp, .dbf, .shx`**) and **`LUCAS06`** (**`.shp, .dbf, .shx`**) respectively. LUCAS field photos (if available) have to be copied from the separate source CD/DVD or from internet into the **`photo00`** and **`photo06`** subdirectories respectively.

Prior to beginning the interpretation each map sheet directory contains two subdirectories and four files. One of the four files is the project file **`interch2.apr`**, which contains **InterChange** program. The other three files make up the *CLC2000 source database* in ArcView shape file format. The name of these three files must be exactly the same as the map sheet directory containing them. The record structure, the fields' name, size and type are strictly bound in the **`.dbf`** file. The two subdirectories bear the same names for all sheets: **`Revision`** and **`Change`**. Before starting the interpretation these contain only satellite images to be used in the corresponding tasks.

`Revision` subdirectory includes images from the early 2000's needed for the correction of CLC2000 database – practically the ones that were originally used for creating the CLC2000 database.

In **`Change`** subdirectory images from around year 2006 for change detection should be placed.

An example of directory structure before beginning the interpretation:



9.2. CLC2000 source database

Data record structure of CLC2000 source databases as found in map sheet directories at the beginning of work:

- **Shape** field:

The polygon that the data record belongs to.

- **Code2000** field: numeric (#FIELD_DECIMAL), 5 digits, 0 decimal.

CORINE category code data inherited from the original CLC2000 database.

- **Area** field: numeric (#FIELD_DECIMAL), 12 digits, 2 decimals.

Area of the polygon in square metre.

- **Perimeter** field: numeric (#FIELD_DECIMAL), 12 digits, 2 decimals.

Perimeter of the polygon in metre. InterChange uses it for polygon identification and error prevention.

- **Comment** field: character (#FIELD_VCHAR), 255 characters.

Interpreter's comments on the polygon.

- **Error** field: character (#FIELD_VCHAR), 50 characters.

Errors of the polygon given as text.

- **E** field: numeric (#FIELD_DECIMAL), 2 digits, 0 decimal.

Errors of the polygon given numerically (as a code).

- **Done** field: numeric (#FIELD_DECIMAL), 1 digits, 0 decimal.

Revised status of the polygon.

9.3. Change database

Data record structure of change databases created by **InterChange**:

- **Shape** field:

The polygon that the data record belongs to.

- **CLC2000** field: numeric (#FIELD_DECIMAL), 5 digits, 0 decimal.

CORINE category code data of the change polygon inherited from the CLC2000 database.

- **Code2000** field: numeric (#FIELD_DECIMAL), 5 digits, 0 decimal.

CORINE category code data of the change in year 2000.

- **Code2006** field: numeric (#FIELD_DECIMAL), 5 digits, 0 decimal.

CORINE category code data of the change in year 2006.

- **Area** field: numeric (#FIELD_DECIMAL), 12 digits, 2 decimals.

Area of the polygon in square metre.

- **Perimeter** field: numeric (#FIELD_DECIMAL), 12 digits, 2 decimals.

Perimeter of the polygon in metre. InterChange uses it for polygon identification and error prevention.

- **Comment** field: character (#FIELD_VCHAR), 255 characters.

Interpreter's comments on the polygon.

- **Error** field: character (#FIELD_VCHAR), 50 characters.

Errors of the polygon given as text.

- **E** field: numeric (#FIELD_DECIMAL), 2 digits, 0 decimal.

Errors of the polygon given numerically (as a code).

- **T** field: numeric (#FIELD_DECIMAL), 1 digits, 0 decimal.

Technical change attribute.

- **P** field: numeric (#FIELD_DECIMAL), 1 digits, 0 decimal.

Probability of the change.

Label field: numeric (#FIELD_VCHAR), 16 characters.

Label of the change polygon (*Code2000 -- Code2006*).

9.4. Error checking process

Intersecting overlapping polygons

Longest part of error checking, so during this process a *Stop* button appears beside progress bar, which enables you to stop the process. *Stop* button does not appear while the program performs other shorter processes of error checking.

Overlaps are those parts of the map sheet that belong to more than one polygon. Finding and correcting overlaps might take several minutes depending on number and complexity of polygons and the computer's performance. During the process the progress bar might not move on for some time when checking especially big and difficult polygons; you are asked to have patience during this.

Taking apart multipart polygons

Multipart polygons consist of more polygons in terms of topology, but a single common data record belongs to them. They could be created by unifying non-adjacent polygons or by splitting a polygon with a single splitting line into three parts instead of two. These possible mistakes are however checked and indicated during polygon editing, so they are unlikely to appear. After being taken apart, multipart polygons lose the content of code, comment, error and remark data fields, because they were presumably originally incorrect in case of at least one of the parts.

Re-calculating polygon data

After correcting topology errors, the program re-calculates area and perimeter values for each polygon.

Marking polygons under size limit

The program writes the *size* notice into *Error* field of those polygons' data record that are smaller than then size limit specified for the given database. In the error code field of these polygons the program sets the second bit, marking size and shape error. These small – sometimes undetectable – polygons might also be born during intersection of overlapping polygons. Small polygons on mapsheet border are usually parts of bigger polygons cut by mapsheet border. In the course of error checking the program writes remark *border* into the *Error* field of these polygons, and the third bit of error code is set. These polygons will be selected neither when switching on error colouring, nor when searching for size error. Error checking does not mark those small polygons that were intentionally kept by the interpreter during the interpretation.

Marking polygons with shape error

The program searches for polygons with average width under the width limit. It writes the *shape* notice into *Error* field of these polygons' data record and sets the second bit, marking size and shape error in their error code field. The program is unable to find polygons whose width is under the limit only in some places.

Marking polygons with invalid category code

This operation serves finding those polygons that have an empty *code* field in their data record (you forgot to give a code when creating it; it lost code or was created during earlier parts of error checking and correction) or the *code* field contains an invalid value (which is impossible if interpretation tools were properly used). For these polygons the program writes *0* into the *code* field, *C2000=xxx* or *C2006=xxx* notice into the *Error* field and in the error code field it sets the first bit marking code error. The number *xxx* written to the *Error* field is the invalid code value (usually zero) the program found in *code* field during error checking.

Marking neighbours with similar code

This process is performed only if **2000 window** was active before starting error checking, thus the CLC2000 database is being checked. The process is also time demanding, so a *Stop* button appears in the status bar beside progress bar to stop error checking with. The program searches for neighbours with similar category code, writes *merge* notice into the *Error* field and in the error code field it sets the fourth bit marking merge error.

10. License

10.1. End user license agreement

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